ростом температуры обработки твердость монотонно возрастает, за счет повышения степени кристалличности и плотности материала, добавление жидкостей (спирта, воды и др.) при формовании таблеток ГАП отрицательно сказывается на прочностных характеристиках. Введение армирующей добавки, оказывает существенное влияние на прочностные характеристики ГАП - позволяет повысить микротвердость материала в ~1.5-2 раза.

Работа выполнена в соответствии с государственным заданием и планами НИР ИХТТ УрО РАН.

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SYNTHESIS AND CATALYTIC ACTIVITY OF LANTHANUM MANGANITE DOPED WITH ALKALI METALS

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Atmosphere protection from technogenic impact is an urgent problem. One of the ways of its solving is the development of catalytic methods for purification of waste gases, including the creation of thermocatalytic devices. They could be designed on the basis of complex oxide materials which could become a cheaper alternative to platinum group catalysts currently used.

Complex oxides with perovskite structure $La_{1-x}M_{0.1}MnO_{3\pm y}$ (M = Li, Na, K, Rb, Cs) were synthesized by pyrolysis of polymer-salt compositions. They were obtained as ultrafine powders and as a coat on a substrate. Nitrates of appropriate metals and polyvinyl alcohol were used as initial substances, taken in stoichiometric amount of combustion reaction. Characteristics of the pyrolysis process (temperature, composition of waste gases, thermochemical charge generation) were investigated in order to examine the impact of the synthesis conditions on the properties of the obtained materials. Foamed nickel (pore diameter 2-3 mm) was used as substrate. It was preheated at 550°C in order to obtain NiO before the formation of complex oxide on its surface. Intermediate layer provided better adhesion of complex oxide and protected the substrate from degradation.

Physico-chemical properties of obtained complex oxides were investigated. Phase composition was identified by X-ray powder diffraction (diffractometer Bruker D8 ADVANCE, CuKα), morphology – scanning electron microscope AURIGA

CrossBeam (Carl Zeiss NTS), specific surface – automatic analyzer TRISTAR 3020 (Micromeritics). Catalytic activity was investigated for the reaction of soot oxidation. Experiments were performed in open air reactor at fixed temperature (200-450°C, step 50°). The «real soot» which is formed in the conditions of incomplete combustion of fuel was taken. Tight contact between particles of soot and complex oxide (fourfold excess) was realized. The technique of applying soot over the catalytic layer was worked out to study the catalytic activity of the coated samples.

It was found that the introduction of alkali metals in the structure of $LaMnO_{3\pm y}$ leads to the formation of solid solutions on its basis thus reflections of other phases were not detected. Catalytic activity of obtained complex oxides was higher than for undoped one. It should be noted that for dopants from Li to Cs the growth of catalytic activity correlated with that for ionic radiuses. Catalytic activity of coated samples was higher for all examined samples.

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ЛЮМИНЕСЦЕНЦИЯ НАНОПОРИСТОГО АНОДНОГО ОКСИДА ПОЛУЧЕННОГО ИЗ АЛЮМИНИЯ ДОПИРОВАННОГО РЗЭ

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LUMINESCENCE OF NANOPOROUS ANODIC OXIDE OBTAINED FROM RARE EARTH DOPED ALUMINUM

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By anodic oxidation of Al-0.01%Ce alloy foil in a four-component electrolyte solution (a mixture of oxalic, citric, boric acids and isopropyl alcohol), nanoporous anodic aluminum oxide layers were obtained and its photoluminescence was investigated.

Фотолюминесценция пористого анодного оксида алюминия (АОА) в голубой области спектра обусловлена, по мнению многих исследователей, дефектами его аморфной структуры. Это кислородные дефекты – дырочные центры (O^-) и одно- и двухэлектронные вакансии (F-центры) [1]. Другие связывают свечение с влиянием оптически активных углеродсодержащих продуктов, встраиваемых в